National Steel

Material Safety Data Sheet

Material Name: Iron Alloy (Steel) **ID: NS-001**

*** Section 1 - Chemical Product and Company Identification ***

Chemical Name: Mixture
Product Use: Slab, Roll and Sheet Products
Manufacturer Information

National Steel Corporation
4100 Edison Lakes Parkway
Mishawaka, IN 46545

Phone: (574) 273-7000

Emergency: (574) 273-7000

*** Section 2 - Composition / Information on Ingredients ***

CAS #	Component	Percent
7439-89-6	Iron	95-99
7439-96-5	Manganese	0-3.3
7440-21-3	Silicon	0-1.4
7440-47-3	Chromium	0-1
7440-02-0	Nickel	0-0.9
7429-90-5	Aluminum	0-0.7
7440-50-8	Copper	0-0.54
7440-36-0	Antimony	0-0.1

Coated Product May Also Contain:

CAS #	Component	Percent
7440-66-6	Zinc	0-10.3
7429-90-5	Aluminum	0-3.7
7440-31-5	Tin	0-2.5
7440-47-3	Chromium	0-2.0
7440-36-0	Antimony	0-0.06

Component Related Regulatory Information

This product is a mixture of metals. Certain metals released from the product may be regulated and have exposure limits identified as the following: Zinc compounds, Manganese compounds, n.o.s., Chromium compounds, Nickel compounds, Copper compounds, n.o.s..

Component Information

As supplied, this product is not classified as a hazardous chemical under 29 CFR 1910.1200 (Hazard Communication), however, dusts, particulates or fumes generated in the processing of this product are hazardous chemicals.

*** Section 3 – Hazards Identification ***

Emergency Overview

Product is a solid iron alloy. As supplied, this product does not present a physical or health hazard. Processing of the product for some final uses can include formation of dusts, particulates or fumes that may present certain health hazards. Dusts from this product may pose a dust explosion hazard. Contact of molten product with water can cause an explosion hazard. Firefighters should wear a positive pressure self-contained breathing apparatus with full face-piece.

Hazard Statements

Dusts, particulates and vapors that may be produced in the processing of this product, may be irritating to the eyes, skin, respiratory system and gastrointestinal tract. Dusts, particulates or fumes that may be produced may contain metals that cause metal fume fever, a flu-like condition lasting 24 to 48 hours and includes fever, chills, aches, cough and general malaise. Exposure to dusts, particulates or fumes containing nickel may cause cancer. Fumes containing metallic components in this product may be hazardous.

Potential Health Effects: Eyes

Dust or powder may be irritating to the eyes. Rubbing may cause abrasion of the cornea.

Potential Health Effects: Skin

Dust or powder may irritate the skin. Rubbing may increase mechanical irritation to the skin. Product contains chromium and nickel, which may cause an allergic skin reaction. No components of this product are known to be absorbed through the skin.

Potential Health Effects: Ingestion

Dusts or powders may cause temporary irritation of the throat, stomach and gastrointestinal tract.

Potential Health Effects: Inhalation

Dusts and powders from this product may cause irritation to the nasal passages and respiratory tract. When inhaled in very large amounts, damage to the lung may occur. Dusts, particulates or fumes that may be produced may contain metals that cause metal fume fever, a transitory condition including fever, chills, aches, cough and general malaise. Repeated exposure may lead to respiratory sensitization reactions, producing an asthma-like condition.

HMIS Ratings: Health: 1* **Fire:** 0 **Reactivity:** 0 **Personnel Protection:** safety glasses, gloves

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

For contact with dusts or particulates, flush eyes with water for 15 minutes. Eye injuries from solid particles should be treated by a physician immediately.

First Aid: Skin

For skin contact with dusts or powders, wash immediately with soap and water. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.

First Aid: Ingestion

No need for first aid is anticipated if material is swallowed, however if symptoms develop, seek medical attention.

First Aid: Inhalation

If large amounts of dusts, fumes or particulates are generated, move person to fresh air. If symptoms develop, seek medical attention.

First Aid: Notes to Physician

Respiratory disorders may be aggravated by exposure to metallic dusts or fumes.

* * * Section 5 – Fire Fighting Measures * * *

Flash Point: Not applicable
Upper Flammable Limit (UFL): Not applicable
Auto Ignition: Not applicable
Rate of Burning: Not applicable
Method Used: Not applicable
Lower Flammable Limit (LFL): Not applicable
Flammability Classification: Not applicable

General Fire Hazards

This material will not burn. Fine dusts of this material mixed with oxygen and a suitable source of ignition my pose an explosion hazard.

Hazardous Combustion Products

Material will begin softening at approximately 2400 °F, will proceed to a liquid and will form irritating and toxic gaseous metallic oxides at extremely high temperatures.

Extinguishing Media

Use methods for the surrounding fire.

Fire Fighting Equipment/Instructions

Firefighters should wear full-face, self-contained breathing apparatus and impervious protective clothing.

NFPA Ratings: Health: 1 **Fire:** 0 **Reactivity:** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

* * * Section 6 - Accidental Release Measures * * *

Containment Procedures

Containment of this material should not be necessary. If dusts or particulates are generated, eliminate sources of ignition.

Clean-Up Procedures

Small pieces of this product may be collected with a broom and shovel. Dusts and particulates may be collected by using a vacuum with a HEPA filter. If sweeping of a contaminated area is necessary, use a dust suppressant agent. Place collected material in a closed container.

Evacuation Procedures

Isolate area. Keep unnecessary personnel away.

Special Procedures

None necessary.

*** Section 7 - Handling and Storage ***

Handling Procedures

Avoid generating dusts or particulates. Avoid inhalation of dusts, particulates or fumes. Avoid contact of dusts or particulates with eyes or skin. Wash thoroughly after handling.

Storage Procedures

Store in a dry area.

*** Section 8 – Exposure Controls / Personal Protection ***

Exposure Guidelines

A: General Product Information

Follow all applicable exposure limits.

B: Component Exposure Limits

Manganese (7439-96-5)

ACGIH: 0.2 mg/m3 TWA
OSHA: 1 mg/m3 TWA (fume)
5 mg/m3 Ceiling
NIOSH: 1 mg/m3 TWA
3 mg/m3 STEL

Silicon (7440-21-3)

ACGIH: 10 mg/m3 TWA
OSHA: 10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
NIOSH: 10 mg/m3 TWA (total); 5 mg/m3 TWA (respirable dust)

Tin (7440-31-5)

ACGIH: 2 mg/m3 TWA
OSHA: 2 mg/m3 TWA
NIOSH: 2 mg/m3 TWA

Aluminum (7429-90-5)

ACGIH: 10 mg/m3 TWA (metal dust)
OSHA: 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
NIOSH: 10 mg/m3 TWA (total); 5 mg/m3 TWA (respirable dust); 5 mg/m3 TWA (pyro powders and welding fumes)

Chromium (7440-47-3)

ACGIH: 0.5 mg/m3 TWA
OSHA: 1 mg/m3 TWA
NIOSH: 0.5 mg/m3 TWA

Nickel (7440-02-0)

ACGIH: 1.5 mg/m3 TWA (inhalable fraction)
OSHA: 1 mg/m3 TWA
NIOSH: 0.015 mg/m3 TWA (as Ni)

Copper (7440-50-8)
ACGIH: 0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dusts and mists, as Cu)
OSHA: 0.1 mg/m3 TWA (fume, dusts, mists as Cu)
NIOSH: 1 mg/m3 TWA (dusts and mists); 0.1 mg/m3 TWA (fume)

Antimony (7440-36-0)
ACGIH: 0.5 mg/m3 TWA
OSHA: 0.5 mg/m3 TWA
NIOSH: 0.5 mg/m3 TWA

Engineering Controls
Whenever dusts, particulates or fumes are generated, use appropriate local exhaust ventilation to keep exposures below the regulated limits.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face
Wear safety glasses with side shields.

Personal Protective Equipment: Skin
Wear leather or other appropriate gloves, if necessary for the type of operation.

Personal Protective Equipment: Respiratory
When dusts or thermal processing fumes are generated and ventilation is not sufficient to effectively remove them, appropriate NIOSH/MSHA approved respiratory protection must be provided.

Personal Protective Equipment: General
Use good industrial hygiene practices in handling this material.

*** Section 9 - Physical & Chemical Properties ***

Appearance:	Metallic color	**Odor:**	None
Physical State:	Solid	**pH:**	Not applicable
Vapor Pressure:	Not applicable	**Vapor Density:**	Not applicable
Boiling Point:	Not available	**Melting Point:**	2400 - 2800 °F (1315 - 1538 °C)
Solubility (H2O):	Insoluble	**Specific Gravity:**	7.5 - 8.5 g/cm^3
Softening Point:	2400 °F (1315 °C)		

*** Section 10 – Chemical Stability & Reactivity Information ***

Chemical Stability
Product is stable.

Chemical Stability: Conditions to Avoid
None known.

Incompatibility
None known.

Hazardous Decomposition
Material will begin softening at approximately 2400 °F, will proceed to a liquid and will form irritating and toxic gaseous metallic oxides at extremely high temperatures.

Hazardous Polymerization
Will not occur.

*** Section 11 - Toxicological Information ***

Acute and Chronic Toxicity

A: General Product Information
The product as shipped, does not present a health hazard. Operations which supply sufficient energy to the product (i.e. welding, high speed grinding or melting) can release dust or fumes which may make components of the product biologically available.

Exposure to dusts or fumes from some metals including iron, manganese, chromium, copper and zinc can produce a condition known as metal fume fever, a flu-like illness with nausea, vomiting, chest tightness, muscle aches and weakness.

Chronic exposure to iron can lead to mottling of the lungs, a condition known as siderosis which is a benign pneumoconiosis and does not cause significant physiologic impairment of the lung.
Early signs of manganese poisoning are sluggishness, loss of appetite, sleepiness, weakness in the legs, uncontrollable laughter, hallucinations, delusions, spastic or slow gait, speech impairment, aggressiveness, tremor, mask-like faces, and clumsy movements. Occupational exposure to manganese has been reported to increase the incidence of pneumonia, bronchitis and lung inflammation.
Exposure to chromium (VI) can cause allergic contact dermatitis and skin ulceration, perforation of the nasal septum and lung, and kidney and liver damage.
Inhalation of aluminum dust may cause aluminosis, a type of pulmonary fibrosis.
Occupational exposure to antimony can cause a form of dermatitis known as antimony spots. Chronic inhalation of antimony can cause pneumoconiosis which can progress to obstructive lung disease. Chronic exposure to antimony can also cause eye irritation, diarrhea, vomiting, abdominal cramps, gastric ulcerations and cardiac effects.
Chronic exposure to copper fume or dust can cause respiratory tract irritation, hemolytic anemia and allergic contact dermatitis.
Chronic exposure to nickel can cause rhinitis, sinusitis and permanent allergic contact dermatitis and sensitization.
Chronic inhalation of tin dusts or fumes can cause a condition known as stannosis which is a benign pneumoconiosis and does not cause significant physiological impairment of the lung.
Dusts and fumes from this product may cause cancer, reproductive and/or birth defects.

B: Component Analysis - LD50/LC50

Iron (7439-89-6)
Oral LD50 Rat: 30 gm/kg

Manganese (7439-96-5)
Oral LD50 Rat: 9 gm/kg

Silicon (7440-21-3)
Oral LD50 Rat: 3160 mg/kg

Antimony (7440-36-0)
Oral LD50 Rat: 7 gm/kg

Carcinogenicity

A: General Product Information

No information available for the product.
Occupational exposure to nickel dusts or fumes increases the risk of respiratory cancers.
Chronic exposure to chromium (VI) has been associated with an increased risk of cancer.
Inhalation of antimony produced lung tumors in experimental animals, and there is a possible link between occupational exposure and lung cancer in humans.
Copper has caused cancer when implanted in experimental animals.
Tin has been shown to cause tumors in experimental animals.

B: Component Carcinogenicity

Chromium (7440-47-3)
ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Monograph 49, 1990 (Group 3 (not classifiable))

Nickel (7440-02-0)
ACGIH: A5 - Not Suspected as a Human Carcinogen
NIOSH: occupational carcinogen
NTP: Suspect Carcinogen; (under Nickel and Certain Nickel Compounds) (Possible Select Carcinogen)
IARC: Monograph 49, 1990; (Evaluated as a group) (related to Nickel compounds) (Group 1 (carcinogenic to humans))

Epidemiology

No information available for the product.

Neurotoxicity

No information available for the product.

Chronic exposure to manganese can lead to the neurological condition of parkinsonism and to diminished fine motor coordination.

Occupational exposure to aluminum has been associated with increased adverse effects on the central nervous system.

Mutagenicity

No information available for the product.

Manganese and chromium (VI) have been shown to cause mutations in experimental systems.

Aluminum and antimony have been shown to increase the number of sister chromatid exchanges and antimony is clastogenic when orally administered to laboratory animals.

Copper can induce DNA structural transformations and chromosomal aberrations.

Nickel inhibited DNA repair and induced transformation in experimental assays.

Teratogenicity

No information available for the product.

Manganese, chromium and aluminum have been shown to have teratogenic effects.

Manganese, chromium, antimony, copper and nickel have been reported to have adverse reproductive effects in experimental animals.

Chromium, copper and nickel have been shown to be fetotoxic in experimental animals.

Other Toxicological Information

None identified.

*** Section 12 - Ecological Information ***

Ecotoxicity

A: General Product Information

No information available for the product.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Zinc (7440-66-6)

Test & Species		Conditions
LC50 (96 hr) fathead minnow	6.4 mg/L	100 mg CaCO3/L
LC50 (96 hr) rainbow trout	4.8 mg/L	juveniles, 333 - 504 mg CaCO3/L
LC50 (96 hr) bluegill	5.4 mg/L	20 mg CaCO3/L
IC50 (96 hr) freshwater algae (Selenastrum capricornutum)	30 ug/L	
LC50 (72 hr) water flea	5 - 14 ug/L	30 °C

Nickel (7440-02-0)

Test & Species		Conditions
LC50 (96 hr) rainbow trout (adults)	31.7 mg/L	hard water
LC50 (96 hr) fathead minnow	3.1 mg/L	pH = 8.0 - 8.5
IC50 (72 hr) freshwater algae (4 species)	100 - 700 ug/L	
LC50 (96 hr) water flea	510 ug/L	45 mg CaCO3/L

Copper (7440-50-8)

Test & Species		Conditions
LC50 (96 hr) fathead minnow	23 ug/L	20 mg CaCO3/L
LC50 (96 hr) rainbow trout	13.8 ug/L	juveniles
LC50 (96 hr) bluegill	236 - 892 ug/L	adults
IC50 (72 hr) freshwater algae (Scenedesmus subspicatus)	120 ug/L	
LC50 (96 hr) water flea	10 ug/L	45 mg CaCO3/L
LC50 (96 hr) water flea	200 ug/L	226 mg CaCO3/L

Environmental Fate

No information available for the product.

*** Section 13 - Disposal Considerations ***

US EPA Waste Number & Descriptions

A: General Product Information

This product contains a component or components identified as hazardous under 40 CFR 261.24.

B: Component Waste Numbers

Chromium (7440-47-3)

RCRA: waste number D007; regulatory level = 5.0 mg/L

Disposal Instructions

This product is not regulated as a hazardous waste by the federal EPA. Collected dusts and other similar wastes generated during processing of the product could contain a constituent identified as hazardous under 40 CFR § 261.24.

*** Section 14 - Transportation Information ***

US DOT Information

Shipping Name: Not regulated as dangerous goods.
Hazard Class: None
UN/NA #: None
Packing Group: None
Required Label(s): None
Additional Info.: None

International Transportation Regulations

Not regulated as dangerous goods.

*** Section 15 - Regulatory Information ***

US Federal Regulations

A: General Product Information

No information available for the product.

B: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Zinc (7440-66-6)

SARA 313: form R reporting required for 1.0% de minimis concentration (only fume or dust)
form R reporting required for 1.0% de minimis concentration; Chemical Category N982 (related to Zinc compounds)

CERCLA: final RQ = 1000 pounds (454 kg) (no reporting of releases of this hazardous substance is required if the diameter of the solid metal released is equal to or exceeds 0.004 inches)
statutory RQ = 1 pound (0.454 kg) (related to Zinc compounds)

Manganese (7439-96-5)

SARA 313: form R reporting required for 1.0% de minimis concentration
form R reporting required for 1.0% de minimis concentration; Chemical Category N450 (related to Manganese compounds)

CERCLA: Statutory RQ = 1 pound (.454 kg); no final RQ is being assigned to the generic or broad class (related to Manganese compounds)

Chromium (7440-47-3)

CERCLA: final RQ = 5000 pounds (2270 kg) (no reporting of releases of this hazardous material is required if the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches)
CERCLA statutory RQ is 1 pound (0.454 kg); no RQ is being assigned to the generic or broad class (related to Chromium compounds)

Nickel (7440-02-0)

SARA 313: form R reporting required for 0.1% de minimis concentration
form R reporting required for 0.1% de minimis concentration; Chemical Category N495 (related to Nickel compounds)

CERCLA: final RQ = 100 pounds (45.4 kg) (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches)
CERCLA statutory RQ is 1 pound (0.454 kg); no RQ is being assigned to the generic or broad class (related to Nickel compounds)

State Regulations

A: General Product Information

Other state regulations may apply. Check individual state requirements.

B: Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS #	CA	FL	MA	MN	NJ	PA
Iron	7439-89-6	Yes	No	No	No	No	No
Zinc ([1]related to Zinc compounds)	7440-66-6	Yes[1]	Yes	Yes	No	Yes	Yes
Manganese ([1]related to Manganese compounds) ([2]related to Manganese compounds, n.o.s.)	7439-96-5	Yes[1]	Yes	Yes	Yes[2]	Yes	Yes
Silicon	7440-21-3	No	No	Yes	Yes	Yes	Yes
Tin	7440-31-5	Yes	Yes	Yes	Yes	Yes	Yes
Aluminum	7429-90-5	Yes	Yes	Yes	Yes	Yes	Yes
Chromium ([1]related to Chromium compounds)	7440-47-3	Yes[1]	Yes	Yes	Yes	Yes	Yes
Nickel ([1]related to Nickel compounds)	7440-02-0	Yes[1]	Yes	Yes	Yes	Yes	Yes
Copper	7440-50-8	Yes	Yes	Yes	Yes	Yes	Yes
Antimony	7440-36-0	Yes	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):
WARNING! This product contains a chemical known to the state of California to cause cancer.

Canadian WHMIS Information

D2A, D2B Materials Causing Other Toxic Effects

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Manganese	7439-96-5	1%; English Item 974; French Item 1077
Tin	7440-31-5	1%; English Item 1571; French Item 804
Chromium	7440-47-3	0.1%; English Item 399; French Item 561
Nickel	7440-02-0	0.1%; English Item 1126; French Item 1193

Additional Regulatory Information

A: General Product Information

No information available for the product.

B: Component Analysis - InventoryComponent Analysis - Inventory

Component	CAS #	TSCA	DSL	EINECS
Iron	7439-89-6	Yes	Yes	Yes
Zinc	7440-66-6	Yes	Yes	Yes
Manganese	7439-96-5	Yes	Yes	Yes
Silicon	7440-21-3	Yes	Yes	Yes
Tin	7440-31-5	Yes	Yes	Yes
Aluminum	7429-90-5	Yes	Yes	Yes
Chromium	7440-47-3	Yes	Yes	Yes
Nickel	7440-02-0	Yes	Yes	Yes
Copper	7440-50-8	Yes	Yes	Yes
Antimony	7440-36-0	Yes	Yes	Yes

*** Section 16 - Other Information ***

Other Information

Reasonable care has been taken in the preparation of this information, but the manufacturer makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use.

Supercedes MSDS for this product from 10/1997.

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists. CERCLA = Comprehensive Environmental Response, Compensation and Liability Act. CFR = Code of Federal Regulations. DSL = Canadian Domestic Substance List. EINECS = European Inventory of New and Existing Chemical Substances. EPA = Environmental Protection Agency. HEPA = High Efficiency Particulate Air. HMIS = Hazardous Material Information System. IARC = International Agency for Research on Cancer. NFPA = National Fire Protection Association. NIOSH = National Institute of Occupational Safety and Health. NJTSR = New Jersey Trade Secret Registry. NTP = National Toxicology Program. OSHA = Occupational Safety and Health Administration. NA = Not available or Not Applicable. SARA = Superfund Amendments and Reauthorization Act. TLV = Threshold Limit Value. TSCA = Toxic Substance Control Act. WHMIS = Workplace Hazardous Materials Information System.

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This is the end of MSDS # NS-001